RADIOTHERAPY IN THE TREATMENT OF CUTANEOUS AND BUCCAL MALIGNANCY

Alexander A. Charteris.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

To facilitate reference, the relevant tables and photographs follow each section.

The illustrations include many taken during the earlier years and their quality is not so good as that of the more recent photographs but they represent the best we could do at the time and have therefore been retained.

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INTRODUCTION

A review of treatment methods and of the results obtained therefrom is always valuable both to show what is actually being accomplished and to indicate how technique may be improved, yet the choice of cutaneous and buccal malignancy as a subject may seem unusual since the tumours concerned include the first to be dealt with efficiently by radiotherapy which is still generally reckoned to be the method of choice for most of the cases. In recent years, however, this view has been challenged to some extent through the advances of surgery and anaesthetics, the use of antibiotics and the development of plastic surgery. For this reason it seemed worth while drawing on experience which dates from 1926 to see what the general position is and what future developments might be envisaged commenting at the same time on diagnostic problems.

Enormous changes have taken place since, in those earlier days, radiotherapy as such did not exist and the importance of biological response to treatment and of the special pathological implications had only begun to take shape for most of us. The correlation of all these considerations with adequately controlled doses of radiation had to await technical and physical advances and so many of the treatments involved during the earlier years discussed here present technical deficiencies which would not now be tolerated. Those who like myself had the temerity to envisage an important branch of medicine arising out of these earlier struggles had many difficulties to face and as work on the Continent was at that time better developed,

visits/

visits to certain centres abroad were essential. My own travels outwith hospitals in this country took me to Paris, Brussels and Stockholm and I was able to compare notes with others who went further afield.

It has been inevitable that work of this kind should be pursued in an atmosphere of change and as the increasing applicability of radiotherapy in medicine and surgery became apparent, there has been an added incentive to devise or improve treatment methods. The more recent developments in both apparatus and methods make great demands upon a radiotherapy department and call for workshop and physical facilities of a high order, all of which has led to centralisation of apparatus and treatment. The lack of the highly trained medical manpower required is another reason for such a policy being adopted. This new phase has led to some interesting developments in regional organisation and I have been able to initiate, with splendid collaboration from many colleagues, a scheme which takes in a large number of hospitals in the West of Scotland. In general, treatments are centralised and at the same time peripheral clinics provided for consultation regarding new cases and follow-up examination for old ones, the patient remaining in association with his original consultant. The next phase of development will be the provision of the more powerful types of apparatus now available both to make treatment easier for patients and staff and we hope and believe to raise the survival rates. A feature of the work all along has been my introduction of a complete follow-up system which began very early and was working well before 1930. All will agree that this is an essential feature if full evaluation of results is to be carried out and the extension of a cancer records system to the whole of

Scotland/

Scotland, as now being envisaged, should give much more accurate statistical information. Preparative work on this scheme is now going on and I am taking part in it at the Department of Health.

General Statement.

It may be said at once that the majority of basal cell and squamous carcinomas of the skin can be treated by radiotherapy quite simply with good results provided that the correct treatment method is available for the particular case and that certain rules are strictly followed. There remains a group where, through the appearance of certain complicating factors to be noted later, surgery is the preferable method, but such cases form a small proportion of the whole. As usual, the closest co-operation between the radiotherapist, the surgeon, the dermatologist and the plastic surgeon is essential if the best treatment is to be planned.

In the case of buccal malignancy, the site and extent of the lesion together with the possibility of invasion of adjacent structures are vital factors in assessing the case, while various biological aspects have to be taken into account, and a serious problem presents itself when invasion of cervical lymphatic nodes has taken place. It is hoped to show that for cases which are not advanced the outlook with radiotherapy is favourable, but where more extensive lesions are encountered there will be a high proportion where no radical treatment of any kind is possible or where healing can only be expected in a few instances: recent investigation in my department indicates that among patients with buccal carcinoma sent to us over 30 per cent are beyond the stage where radical treatment is possible. The importance of early diagnosis is obvious and again co-operation with the various colleagues involved is of the greatest value. In recent years the help given by the plastic surgeon has become

of increasing importance.

Assessment of Treatability.

It would seem essential to consider the facts upon which the radiotherapist must base his assessment of treatability by irradiation. The site is obviously of importance both from the standpoint of accessibility and of proximity to some important organ like the eye while the possibility of a good result must diminish steadily as the local extent of the growth increases since interference with blood supply may be so caused and the geographical difficulties of treating adequately the whole affected region must increase. In many cases there will also be a greater possibility of the occurrence of metastases. Invasion of bone or cartilage is a serious problem since it is unlikely that conservative methods will deal with tumour growth in such tissue although the same neoplasm may be quite amenable to radiotherapy while growing in a more vascular stroma. Quite recently it has seemed that this development may not always be a complete contra-indication to radiotherapy and this will be referred to again: in the period under review it could only be regarded as a very serious development. It is also well known that buccal or other tumours which respond well at the primary site may not do so when they invade the related lymph nodes and all these considerations obviously point again to the need for achieving a diagnosis at the earliest possible moment.

A factor not so much stressed as it might be is the radiosensitivity of malignant tumours. This varies greatly and there is much literature on the radiobiological facts involved, but it will suffice to say that lesions considered here are generally reasonably sensitive and sometimes highly sensitive to radiotherapy so that the selective action of treatment can play its full part. Clinical observation may be helpful in assessing the probable/

probable response quite apart from microscopic study since, as a rule, tumours which are of the "cauliflower" variety will respond more readily than those of an infiltrative type. It will not escape notice that the former as a rule tend to be diagnosed at an earlier stage since they produce symptoms more rapidly and also that their superficial nature causes less disturbance of blood supply.

From consideration of all these points an assessment of treatability must be made as regards the primary growth and its areas of probable or actual extension. As has been mentioned, interference with blood supply through previous trauma, sepsis, radiotherapy or extension of the growth itself must be added to the list of points to be considered in coming to a decision. Adequate vascularity is essential to a satisfactory and safe response to irradiation. If the necessary criteria cannot be satisfied, there will rarely be any indication for radical radiotherapy and palliative measures will usually be appropriate provided there is no chance of complete removal of the disease by radical surgical procedures. The value of full consultation before any treatment of any kind is undertaken has been proved by years of experience and is urged as a necessity. The important part played by the peripheral consultative clinics cannot be overestimated in this connection.

Radiotherapeutic Methods.

This communication does not set out to discuss details of technique though the various methods will be referred to as regards their applicability to various situations. An attempt is made to deliver a predetermined dose to the appropriate volume of tissue in such a way and over such a period of time as to produce minimal disturbance in normal tissue and take full advantage of the selective action of the rays upon the tumours concerned.

Doses/

Doses are expressed in roentgens as internationally defined. During the years concerned other units of dose recently suggested were not in use.

For tumours of the skin the main methods employed have been implantation of radium and the use of various qualities of X-rays. The more usual type of implantation lasting for one week and delivering a tissue dose of some 6000r at 0.5 cms. from the plane is only employed for squamous carcinoma and a rapid implantation method introduced by me in 1942 (Charteris 1944) finds its sphere in the treatment of the more sensitive basal cell lesions involving awkwardly placed situations or contours such as in the vicinity of the inner canthus. These methods have evolved from the simple techniques developed in the pre-physics days and referred to elsewhere. No implantations with radioactive cobalt or gold have been employed but radon seeds have been utilised on occasion. Radium moulds are excellent for rodent ulcers but were early abandoned owing to the need for hospitalisation of the patient for at least a week: they are still regularly employed in the treatment of squamous carcinoma of the skin.

X-ray therapy is most useful and applicable to a majority of the skin cases (Smithers 1946). For the most part the quality of rays associated with low voltage is appropriate since one does not usually wish very penetrating radiation or much depth effect: nevertheless a careful estimate must be made of how much tissue should be irradiated so that there is no risk of the depth of the lesion receiving an inadequate dose. Since I took over this side of the work in 1947 I have used X-rays generated at 85 Kv. and at 140 Kv. for most of the cases, the associated rays delivering 60 per cent and 73 per cent of the incident dose respectively at 1 cm. depth as measured with an aperture of 3 cms. diameter. Considerations of this kind are mentioned without going into the technicalities since such

figures/

figures are obviously relevant in planning the depth of tissue which must be treated. X-rays generated at 220-250 Kv. may rarely have to be used when considerable thickness of tissue has to be treated (Fig. 4).

For the buccal range of tumours radium implantations are most valuable and reliable. They are, therefore, employed when the site, extent and accessibility of the lesion permit, while another local method of still more limited application, yet excellent in its own sphere, is the buccal radium applicator. The proved efficacy of such methods and the excellent tissue tolerance associated with the small volumes so irradiated tend to enhance the good results which one would hope for in the relatively early tumours which can be treated in this way (Paterson 1952). The precision with which such treatments can now be given contrasts with the state of affairs in the earlier years covered by this survey. Radium implantation for skin and buccal lesions was then carried out on simple lines with filtered needles as now but with varying linear intensity and filtration, the general aim being the distribution of a certain amount of radioactive material according to the area and volume to be dealt with. My original work had to be on these lines and so was highly individualistic and experimental, any calculations being on the old milligram-hour basis. These estimates were of a primitive character but did give one something to go on until the internationally accepted "roentgen" came into general use. In actual fact these early cases did remarkably well if not too advanced, and even in 1937 I found it possible to publish a paper on certain aspects of radium work which announced quite encouraging results (Charteris 1937). Later my efforts were greatly helped by the various physicists who worked in my department from 1938 onward and through them we got much more accurate calculations of tissue dosage. All this side of the work became greatly

extended/

extended and supplemented when the Manchester school produced its well known dose system, the first part of which was seen in a paper by Paterson and Parker (1934) and was later followed by a series of communications from various Manchester workers (Meredith 1947).

Where more extensive or awkwardly placed tumours are involved, external methods will be the only ones applicable and my radium beam unit (recently activated by radio-cobalt) is most useful for a considerable range of lesions in the mouth and throat which are beyond the local methods just mentioned. X-rays in the 220-250 Kv. range have been less satisfactory since the qualities obtained at this tension suffer considerable absorption in bone so cutting down the estimated dose in cases where, for example, the mandible is interposed (Spiers 1946). These disabilities were very obvious during the period under review and radium methods, including my development of radium beam technique, were the ones most employed. A statement on the use of X-rays can nowadays be improved by special techniques, such as the use of wedge filters, but these methods did not come into the period dealt with so that the results were influenced. It seems quite clear now that further advances will be made only when apparatus providing more penetrating radiation is made available on a larger scale than at present.

TUMOURS OF THE SKIN

Melanoma.

Although many of these tumours are highly malignant and, therefore, biologically active, experience indicates that they are not radio-sensitive although some hopeful results obtained by radiotherapy have been recorded by Ellis (1939). My policy has been to regard such cases as only suitable for radical surgery though there have been rare occasions when, often for psychological reasons, palliative treatment had to be given. No very striking responses were noted but the patient's condition was not made worse. A further review of this subject as regards treatment has been given by Tod (1946) and Ellis (1946) while, more recently, Windeyer (1954) has obtained a good response in certain cases so that it may be that more attention should be given to radiotherapeutic possibilities while still accepting surgery as the method of choice.

Basal Cell Carcinoma (Rodent Ulcer).

Large numbers of patients suffer from these lesions and the tumours are occasionally multiple. The commonest site is about the face but the lesions can occur in many parts of the body where the diagnosis may not be immediately obvious. Though often regarded as trivial these lesions can get out of hand either through neglect or employment of faulty technique and when they have invaded soft tissue extensively and involved bone or cartilage, they may become quite untreatable by any method (Fig. 1). For the vast majority of rodent ulcers, however, radiotherapy offers a simple and efficient treatment of a conservative nature, but this is only so if certain precautions are constantly borne in mind. From prolonged study of results and observation of the technical details, I believe that the chief reasons for failure are:-

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1. Treatment of too small an area or depth of tissue.

2. Failure to maintain X-ray apparatus in position at a difficult site or to distribute radium accurately.

3. Lack of uniformity of dose as when an X-ray field of small penetration is applied to a very irregular or concave area.

In the last mentioned case the isodose curves, representing the contours of dose distribution, may fit the concavity quite well as at the inner canthus (Smithers 1955) but my policy has been to use radium implantation in such cases to be sure of uniformity in dose (Fig. 2). The possible faults just mentioned can be overcome through care and good planning of treatment but there are others of a clinical nature, such as difficulty in determining the actual edge of a lesion or encountering multicentric origin of skin lesions, while a further cause of failure very rarely seen is that the lesion simply does not respond to the treatment at all. I can recollect one patient who had several rodent ulcers treated and though all were of a non-complicated nature not one yielded to radiotherapy: there must be some subtle biological cause for this which we do not understand. The possibility of deep extension down a tear duct or into the orbit must always be thought of since this would usually make the case unsuitable for ordinary radiotherapy.

Invasion of bone or cartilage is not included among the difficulties to be circumvented or the causes of failure since this is almost always a contra-indication to radiotherapeutic treatment and in general only surgery with complete excision and perhaps plastic repair is adequate for such patients. Other cases for whom surgery should be considered from the start might include those with a very florid type of skin where even slight pallor would be obvious and the cosmetic effect is important, and also certain instances of employment involving abnormal exposure as in the case

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of fishermen and locomotive drivers where prolonged exposure to cold might have a bad effect on the vascularity which would prejudice the nutrition of even the most perfectly treated skin (Fig. 3). One might add to this list old persons having lesions in a very avascular or atrophic skin and lastly cases where radiotherapy might endanger the eye. Such hazards will be dealt with when speaking of complications but, in fact, the only site where there is any serious risk is the upper eyelid when radium is employed.

The diagnosis of rodent ulcers is generally easy but may present difficulties on occasion. The ordinary hypertrophic type with its reddish brown coloration, its suggestion of translucency and the presence of a few skin capillaries on its surface is easily recognised and the ulcerated variety will similarly form no great problem since careful examination will generally reveal the characteristic rolled edge though this may be temporarily concealed by crusting or secondary infection, both of which yield rapidly to suitable local applications. On the other hand the erythematous variety can be very puzzling especially if occurring on some unusual part of the body. There is apparent erythema without gross infiltration yet if the lesion is observed in a good light and the skin put under tension, it will nearly always be possible to see the rolled edge though this may be very tiny and only show up like a thread encircling the periphery of the lesion (Fig. 5). If any cutaneous lesion fails to respond to simple methods of treatment, doubt should be aroused as to its nature and the possibility of biopsy considered. The performance of a biopsy is not a routine procedure but is always carried out if the slightest doubt exists and this policy also applies to squamous carcinoma of the skin.

As has been explained X-ray therapy is used wherever indicated and protraction of the treatment time to at least 5 days is usually adopted

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so as to minimise reaction and get the best cosmetic results. In the low voltage range referred to, doses of 3000-3200r (incident) are regarded as safe for a basal cell lesion as opposed to a squamous one. On some occasions the protraction may be extended if vascularity is poor while conversely in a few instances a single exposure of 2250r is given where there is some strong reason for this procedure and the site and type of skin render it safe. My rapid radium implantation method is kept for the geographically difficult lesions as already explained and the dose 0.5 cms. from the plane of needles is 2800r in 30 hours. It is emphasised that the radium method is reserved for the complicated cases. Actual extent of the lesion alone does not contra-indicate treatment provided none of the contra-indications mentioned exist and a case in point is illustrated in Fig. 4 There was no extension to bone or cartilage and the lesion healed satisfactorily.

There are few complications following X-ray or radium therapy for lesions if the necessary care is taken and the proper dose-time relationship adhered to yet all radically treated tissues undergo some degree of endarteritis obliterans and fibrosis so that they are less able to stand trauma in the future. Friction, pressure and prolonged exposure to severe cold or strong sunlight should, therefore, be avoided or some irritation of the skin may follow. The occurrence of true necrosis due to poor vascularity is very rarely seen provided the treatment is given on the lines indicated but it can occur as has been illustrated in Fig. 3. The patient had bilateral lesions of each temple treated exactly the same way and one of these at a later date was the seat of a superficial necrosis which healed rapidly. It followed a long motor drive on a very cold day, the driver keeping the window open all the time so that the right side of the head

became/

became chilled over a fair period. Post-radiational stigmata (skin pallor and and telangectasis) can usually be avoided or minimised by attention to technical details and especially to the correct protraction of the dose. Lesions in the region of the eye may in healing narrow the tear duct with consequent epiphora but more serious ocular complications are very rare. These include cataract, glaucoma and vascularisation of the cornea, but as has been shown elsewhere (Charteris 1940) treatment of the upper lid is the only site which has to be thought of seriously in this connection. I demonstrated then by ionometric measurements in wax models holding radium needles that the upper eyelid was the one area which was likely to contribute significant doses to the eye. This conformed to clinical findings and suitable precautions were instituted from then onwards. In the case of rapid implantations I introduced eyeshields which acted merely by increasing the distance from the radium to the eye itself since the physical properties of a small radioactive plane indicated that this should suffice. The method was, in fact, successful in terms of physics but more extended clinical experience showed that for some people the waring of an eyeshield for 28 to 30 hours could have a bad effect from its mechanical presence. Complications did appear in two cases and have led to the adoption of surgical procedures for most tumours in this situation. An exception to this policy is sometimes found in the case of a basal cell lesion treated by X-rays with a lead eyeshield beneath the lid: each exposure being only for a few minutes. There is no mechanical irritation and the technique seems quite safe at the comparatively low dose involved in the treatment of a rodent ulcer.

RESULTS

The results of treatment have been expressed at 2 years since this seemed reasonable for comparison between different methods as employed

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for such a radio-sensitive lesion as a rodent ulcer but, in fact, follow-up goes on indefinitely for all cases. Table 1 shows the results obtained with a 60 Kv. X-ray apparatus not in use since 1947 and it will be seen that the follow-up was disappointing since out of 666 cases treated only 498 could be assessed at the end of 2 years. The number of recurrences (107) was very high indeed even assuming that many of those not traced had probably been treated successfully. On taking over the combined radium and X-ray therapy sections in 1947, I therefore began a study of the causes of failure and Table 2 shows that 109 patients were treated in that year. Six patients died of some unrelated cause before the end of 2 years so that the cases concerned were only 103 in number. There were 15 recurrences and study of the records indicated that the applicator size was possibly too small in 11 so that the margin was not adequately treated, and in 2 it seemed likely that an insufficient depth of tissue had been treated, while in the remaining 2 no obvious cause of failure could be detected. In 1948 the recurrence rate was still too high so the rules for treatment were tightened up and I adopted a 1 cm. margin round the lesion while special attention to the depth distribution was urged. It will be seen from the table that in 1949 and 1950 the recurrence rate fell materially and a cross check for 1952 showed it to be much the same, the reduction being from nearly 12 per cent to about 3 per cent.

The results from radium implantation cannot be compared with those just given since the method is used in the main for the more difficult cases as has been explained. Even before physicists were available to assist us, implantations were well established and doing well and in a series treated between 1930 and 1935 I was able to report a recurrence rate of 8 per cent in a total of 76 patients though all the lesions were in awkward positions (Charteris 1940)./

(Charteris 1940). These cases were given treatment over one week using a squamous carcinoma dose but it was felt that this should not be necessary and the rapid method of treatment which was at that time being tried in X-ray work prompted me to see what could be done in the same direction with radium. As a result I initiated the rapid implantation method already referred to and have found it very applicable to the more complicated rodent ulcer cases. My original publication showed a recurrence rate of just under 7 per cent and a more recent survey (Table 3) indicates a recurrence rate of about 8 per cent (6 recurrences in 89 patients). It would seem that this is about the limit of what can be achieved in this particular class of cases and some further thoughts on this will be expressed when I come to deal with the recurrence rate at different sites. In Table 4 are given the results for the years 1947-1950 and it will be observed that they are not quite so good. This is explained by the fact that considerable extension of the work of my department inevitably led to this special work being distributed among a number of people, some of whom had not great experience, whereas in the past I had treated practically all these cases myself. As a cross check the year 1952 was selected and it will be seen from the same table that the position has improved since there were only 4 recurrences in 41 cases though all the lesions were of the complicated variety and 3 of the recurrences were at the notorious inner canthus site.

The value of any statement of results is impaired unless all the cases suffering from the disease can be studied and so an attempt was made to find the total number of rodent ulcers dealt with in this hospital. This was only possible from 1947 onwards and it is freely admitted that Table 5 is possibly incomplete but it is believed that it must account for nearly all the other cases: it shows the small number treated initially by surgery alone and those

who had to be rejected for treatment or refused treatment. The number treated surgically has risen as a result of close co-operation with the plastic clinic and this has helped to solve the problem of such lesions as those affecting the upper eyelid.

DIFFERENTIAL RECURRENCE RATE

During discussions at the regular clinics held between ourselves and the plastic surgeon, it was suggested by Mr. Scott Tough that certain sites of rodent ulcer might carry a specially high risk of recurrence and I therefore went through all the cases for the period from 1947 to 1950 noting the number of recurrences at each site (Table 6). The main figure indicates the total number of lesions at given sites (not patients) and the number of recurrences appears immediately afterwards in brackets. Contrary to expectations the nose and ala nasi came out of this survey fairly well, the radium results being good and the X-ray failures occurring more often in the earlier years. The increased incidence at inner canthus seems almost inevitable at such a difficult site and it should be noted that the apparent superiority of X-ray in this situation is due to the fact that only the more happily placed lesions are treated by X-rays. The lower lid shows a fairly high recurrence rate and it may be that this is due to technical difficulties of implantation but this is doubtful and I am thinking over whether this site should be considered more often for surgery: again X-ray therapy has naturally been used for the better situated lesions much more on the cheek than the actual lid. If all the lesions are considered (radium and X-ray cases) the lower lid shows only 7 recurrences in 60 lesions and the inner canthus 11 in 66 lesions which gives a better idea of the overall results. As has been stated, it is now the usual policy to treat lesions of the upper eyelid with surgery. The differential survey just referred to includes 568 lesions/

lesions treated by X-ray therapy and 136 lesions treated by radium which gives a total of 704 lesions.

The details noted above refer to the influence of site upon results. For completeness it may be stated that failure to respond to treatment seems very rarely due to unusual histological features and it is worth noting that the somewhat rare pigmented rodent ulcer appears just as radiosensitive as the more ordinary variety but a pigmented area of skin may be left where it was situated. When pigmentation is present the diagnosis must be considered with especial care to exclude a melanoma but the usual translucent appearance is generally obvious even in this kind of rodent lesion. In any case of doubt surgery would be the appropriate method. (Fig. 2).

TABLE ONE.

SKIN - RODENT ULCERS

X-ray Therapy : 1935-1946

Cases treated	666
Cases followed up for two years	498
Recurrences	107

Mostly treated by single exposure.

TABLE TWO.

SKIN - RODENT ULCERS

X-ray Therapy : 1947-1950

	Number of Patients.	Number of Lesions.	Recurrences.
1947	109*	127	15
1948	115+	121	15
1949	156	165	5
1950	143	155	5

Mostly fractionated treatment - two year follow-up.

1947 *6 died of other causes before 2 years (103 patients - 121 lesions)
1948 +4 died of other causes before 2 years (111 patients - 117 lesions)

TABLE THREE.

SKIN - RODENT ULCERS

Rapid Radium Implant : 1942-1946

Number of Patients.	Number of lesions.	Recurrences.
89	93	6

17 died before two years.
2 lesions under observation.

2 year follow-up.

TABLE FOUR.

SKIN - RODENT ULCERS
(LATER RESULTS)

Rapid Radium Implant : 1947-1950 and 1952

	Number of Patients.	Recurrences.
1947	29	3
1948	32	5
1949	38	5
1950	37	6
1952	41	4

One lesion per patient - complicated sites.

2 year follow-up.

TABLE FIVE.

SKIN - RODENT ULCERS

1947-1950

	Surgery as initial treatment.	Rejected for treatment or refused.
1947	2	1
1948	3	1
1949	5	4
1950	9	3

TABLE SIX.

SKIN - RODENT ULCERS

Recurrences by Sites (Differential recurrence rate).

Number of Lesions

RADIUM

	Lower Lid.	Inner Canthus.	Nose	Ala.	Others.	Total.
1947	9 (0)	9 (3)*	7 (1)	0 (0)	4 (0)	29 (4)
1948	17 (3)	7 (1)	5 (1)	0 (0)	3+(0)	32 (5)
1949	10 (2)	18 (3)	4 (0)	0 (0)	6 (0)	38 (5)
1950	12 (2)≠	15 (3)	4 (1)	0 (0)	6 (0)	37 (6)
	48 (7)	49 (10)	20 (3)	0 (0)	19 (0)	136 (20)

X-RAY THERAPY.

	Lower Lid.	Inner Canthus.	Nose.	Ala.	Others.	Total.
1947	3 (0)	6 (0)	9 (1)	12 (2)	97 (7)	127 (10)
1948	1 (0)	5 (1)	32 (6)	13 (3)	70 (5)	121 (15)
1949	5 (0)	4 (0)	34 (0)	9 (0)	113 (5)	165 (5)
1950	3 (0)	2 (0)	9 (0)	11 (2)	130 (3)	155 (5)
	12 (0)	17 (1)	84 (7)	45 (7)	410 (20)	568 (35)

*One case includes other lesions at ala nasi and 4 other sites, and everyone of these failed to respond so that some constitutional reason seems likely.

+Including one upper lid.

≠One in-patient (male) who died of carcinoma lung within 6 months.

FIG. 1.

An advanced rodent ulcer showing the effects of deep invasion. This stage is untreatable by radiotherapy.

FIG. 2.

The rodent ulcer on the cheek is readily treated by radiotherapy but that at the inner canthus presents problems.

Both lesions satisfactorily healed.

A hypertrophic type of rodent ulcer showing pigmentation.

FIG. 3.

This patient had similar rodent ulcers on each temple. Both healed but excessive exposure caused necrosis on the right side.

The necrosis is healed with some degree of scarring.

Skin - Melanoma - Rodent Ulcer

FIG. 4.

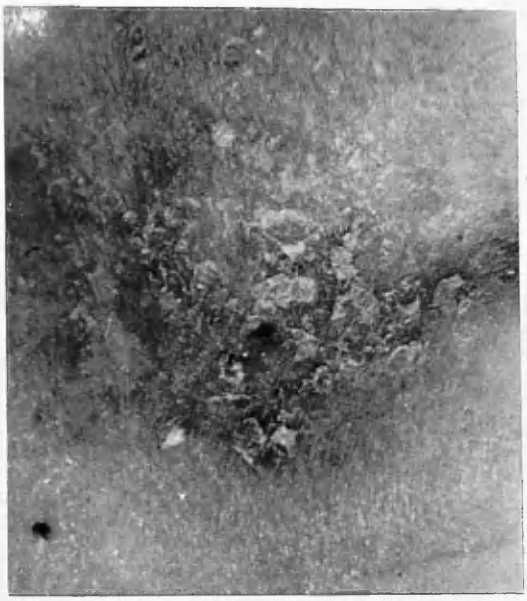
A fairly advanced rodent ulcer successfully treated since it was confined to the soft tissue.

The lesion is healed with some scarring owing to tissue destruction.

Skin - Melanoma - Rodent Ulcer

FIG. 5.

An unusual rodent ulcer in the lumbosacral region. The rolled edge can be seen but diagnosis was delayed until hypertrophic part appeared.



The same lesion seen after treatment. There is still a little dry desquamation.

Squamous Carcinoma of the Skin.

Considerable differences in biological type and, therefore, in radiosensitivity are encountered among squamous carcinomas of the skin yet these lesions are in general reasonably responsive and so suitable for radiotherapy provided that the general rules of treatability can be satisfied. A special feature is the high age incidence since most of the patients are between 60 and 80 years of age, the maximum number being in the decade 71-80. It is, therefore, inevitable that intercurrent disease will cause many deaths and this is shown in the tables which follow. A further feature of sinister import is the possibility of extension to the related lymphatic nodes and when this takes place it affects the prognosis adversely. Methods of treatment for such nodes will be discussed later. As regards diagnosis, suspicion should once more be aroused if some cutaneous lesion will not yield to simple treatment. Hypertrophic or ulcerative lesions appearing in burn scars or in skin affected by lupus vulgaris will be suggestive while the more usual tumour arising in apparently normal skin is generally harder than a rodent growth and does not present the translucent appearance, brownish tint or rolled edge. Ulcerated lesions of this type will often present a reddish granular appearance at the base and most helpful in diagnosis is the appearance of fronds of keratin matted together to form a sort of crust: this contracts with the crust of an ulcerated rodent ulcer which is simply composed of tissue debris. A biopsy will always resolve any doubt and early diagnosis is of the greatest importance here owing to the risk of lymphatic metastases. Most of the growths are about the face (Fig. 6) but a certain number occur on the extremities which form the next most common site noted in these records and in some of these occupational hazards through exposure to tar and certain oils may have played a part. Such

lesions/

lesions appear to respond quite well to treatment provided the skin is reasonably vascular. A usual type of carcinoma of the hand is shown in Fig. 7. A few cases of Bowen's Disease appear in the series and these were found to heal quite readily with doses up to the squamous carcinoma level, and indeed the outlook for such appears to be favourable unless there is a tendency to the formation of multiple lesions. In the past cases of lupus carcinoma or of tumours occurring in burn scars have been treated successfully but in view of the poor vascularity the tendency is now to consider surgery from the start. An unusual site for a squamous carcinoma is illustrated in Fig. 8 where a chronic ulcer in the region of the toes was found after biopsy to be of this nature: it responded well since there was no invasion of tendon or bone. A condition which may be puzzling is the pyogenic granuloma which often arises after some slight injury and presents a curious soft granular red lesion unlike a tumour because there is less friability. It usually responds readily to a small dose of X-rays (Fig. 9).

Treatment calls for higher doses than those effective for rodent ulcers and about 4000r incident dose of X-rays of appropriate quality in four weeks is usual. Protraction of this kind is quite often called for owing to the fact that the skin is generally not very vascular but in a few cases with small treatment areas and more healthy skin this time can safely be reduced. Radium implantation is a useful method, a dose of about 6000r being delivered at 0.5 cms. from the plane in one week while a few cases may be dealt with by radium moulds, the incident dose being 6000r in 10 days. The latter method is especially useful when the skin shows poor nutrition since the protraction minimises the radiational effect upon normal tissue. It is not proposed to go into details of technique but one method which I devised about 1930 has been found so successful in appropriate cases up to the

present/

present day that it will be mentioned. This is the treatment of carcinoma of the pinna by sandwiching the ear between two planes of radium so that a satisfactory uniformity of dose can be attained. The method is applicable to almost all lesions coming within an active area of 3 x 4 cms. except those spreading into the cavum or approaching the side of the head. Only one recurrence after this method has been found in the follow-up records and some details of the technique are given in Appendix A. as well as illustrations.

Complications are much the same as already discussed in the case of rodent ulcers. The higher doses involved make it impossible to treat the upper eyelid.

RESULTS

The results attained in the cases treated between 1947 and 1949 are shown in Table 7. X-rays were used in the treatment of 126 cases and 70 were alive and well for more than 5 years. Of this total 2 had a secondary primary successfully treated by radiotherapy and 3 required surgery in addition to the original radiotherapy. No less than 42 patients died of various forms of intercurrent disease such as carcinoma of the colon, cardiac trouble and cerebral vascular incidents. Thirteen patients died from the disease but some of these were only fit for palliative treatment and some had extension of lymphatic nodes. One patient refused to have treatment.

The results following the use of radium are also shown and once more implantation is the favourite method for any awkwardly placed lesion of ordinary extent. Out of a total of 31 patients 21 were alive and well for at least 5 years, 3 patients have died from the disease and in 2 of these the deaths were due to lymphatic invasion. The high age incidence again accounts for a number of deaths of unrelated cause though this is not so

high/

high in the radium series. All those dying from other causes were apparently free from tumour growth at the time.

It will be seen that planned treatment can give good results in a high proportion of cases, and it is my experience that the risk of technical errors discussed in the section on rodent ulcers seems much less here perhaps owing to the fact that the treatment is generally more protracted so that the effect of any single deviation from the rules may not be so serious. For completeness I have recorded the number of cases known from our records to have had surgery alone but it is not contended that this represents all that have been treated in this way. The figures simply represent all those which I have been able to collect, the total number being only 12 in the 3 years under review.

GENERAL CONCLUSIONS REGARDING SKIN TUMOURS

Radiotherapy would appear to be a satisfactory method of treatment provided that the criteria already discussed can be satisfied and that the irradiation is planned with great care and carried out with accuracy. If study of a patient shows that radiotherapy is not the best method of treatment, it should not be employed at all and surgical excision or, if necessary, excision with plastic repair must be considered instead. The best decisions will be reached where there is free consultation between all those concerned before anything is done to the patient and here the advice of the plastic surgeon will be most valuable. Even when the greatest care is exercised a number of failures are inevitable either through the extent of the primary growth or through the development of lymphatic metastases or, more rarely, because a lesion simply fails to respond in the normal way. Fig. 3 shows a very large rodent ulcer which was satisfactorily treated because it had not involved bone.

Skin - Squamous Carcinoma

The technical side of radiotherapy for skin tumours seems pretty satisfactory and the apparatus available will generally be all that is required although more easily adjustable X-ray plant would be a great help. The main hope for future improvement would, therefore, seem to lie with the achievement of earlier diagnosis and with continued care in the assessment of individual patients. Any relaxation here is likely to have an immediate and unfortunate influence upon results.

TABLE SEVEN.

SKIN - SQUAMOUS CARCINOMA

A. X-ray Therapy.

YEAR.	TOTAL.	ALIVE & WELL. (over 5 years)	DIED OF CANCER.	LOST.	DIED OF OTHER CAUSES.	REJECTED CASE OR REFUSED TREATMENT.
1947	42	27*	4	1	10	1
1948	30	12	1	0	17	0
1949	54	31+	8	0	15	0
	126	70	13	1	42/	1

*One well after excision of tiny recurrent nodule.
+Two after operation.
/Mostly over 5 years.

B. Radium.

YEAR.	TOTAL.	ALIVE & WELL. (over 5 years)	DIED OF CANCER.	LOST.	DIED OF OTHER CAUSES.	REJECTED CASE OR REFUSED TREATMENT.
1947	8	4	2	0	2	0
1948	10	8	0	0	2	0
1949	13	9	1	0	3	0
	31	21	3	0	7	0

C. Surgery Only.

YEAR.	TOTAL.	ALIVE & WELL. (over 5 years)	DIED OF CANCER.	LOST.	DIED OF OTHER CAUSES.	REJECTED CASE OR REFUSED TREATMENT.
1947	3	2	1	0	0	0
1948	2	0	0	0	2	0
1949	7	5	1	0	1	0
	12	7	2	0	3	0

Skin - Squamous Carcinoma

FIG. 6.

A rather fleshy type of squamous carcinoma of skin situated on the cheek. The lesion remained healed for over 10 years. This is the type rather prone to form metastases.

The hard warty type of squamous carcinoma affecting the preauricular region and pinna.

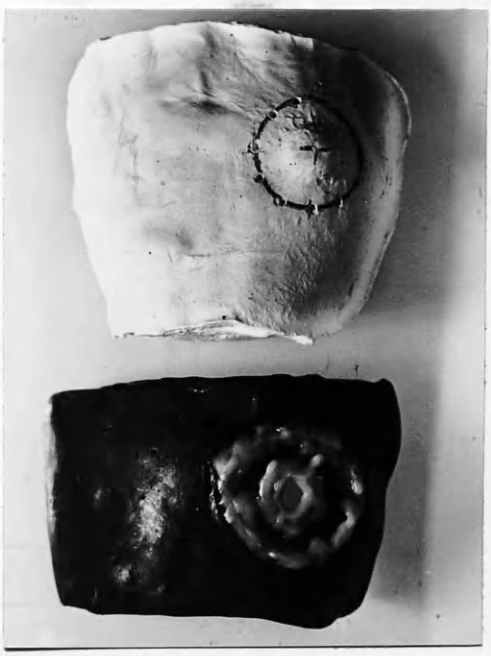
The lesion is healed with minimal skin change.

Skin - Squamous Carcinoma

FIG. 7.

Squamous carcinoma of skin of hand. The malignancy is of low grade.

Lesion satisfactorily healed.



Radium moulds are often employed since there is minimal interference with skin vascularity. The mould here was constructed on a plaster cast.

Skin - Squamous Carcinoma

FIG. 8.

Unusual sites introduce difficulty in diagnosis. This lesion of the toes was confirmed histologically as squamous carcinoma.

The response to treatment has been excellent.

Skin - Squamous Carcinoma

FIG. 9.

A pyogenic granuloma situated on the hand. These lesions may cause some difficulty in diagnosis.

Healing has been achieved through the use of very small doses of X-rays.

BUCCAL CARCINOMA (excluding Lip).

Radiotherapy takes an important place in the treatment of carcinoma occurring within the mouth and once again it is found that if certain conditions can be satisfied good results will follow. Unfortunately, however, many cases are of an advanced nature before they are seen and local extension, invasion of lymphatic nodes and invasion of bone can alter the prognosis materially. As has been stated earlier, a fair proportion of cases come into this category and a survey done for a recent year (1955) shows that 34 per cent of such cases referred to my department were beyond radical treatment of any kind. 32 per cent had involvement of lymphatic nodes and 14 per cent showed invasion of bone when first seen.

Fewer tumours of the mouth are seen than was once the case and it may be that improved dental hygiene has played a part. Certainly the influence of syphilis today seems negligible, leukoplakia and chronic glossitis being quite unusual findings. The type of leukoplakia most often seen at present is the delicate filmy variety, the whitish hypertrophic type being much rarer. It is with the latter type that some risk of neoplastic development can be apprehended and such cases may present a difficult problem when the lesions tend to be multiple. The Wasserman reaction is usually negative in our leukoplakic cases. As a rule the squamous tumours encountered in the mouth are moderately differentiated and many therefore require maximal doses of radiation but towards the back of the tongue less well differentiated varieties are encountered and these carry with them a still greater risk of metastases.

The diagnosis is generally easy but inspection should always be accompanied by palpation which may yield much additional information and can be a vital factor in the early diagnosis of lesions situated posteriorly in the/

the tongue since these are generally submucous for a considerable period and are therefore easily missed. I have termed these lesions "globular tumours" of the tongue and regard them as especially dangerous since they may be inconspicuous for such a long time. Simple acute ulcers associated with digestive upset or with a badly fitting denture, or herpetic ulcers (Fig. 10) generally cause little difficulty but the so called dental fibroma or granuloma (Fig. 11) associated with denture irritation can cause confusion. This lesion is generally situated about the alveolus or perhaps on the hard palate. It is firm, lobulated, pinkish in colour and free from ulceration giving a clinical impression of a normal non-friable tissue which blanches on pressure. Diathermy excision is the only treatment required and histological examination shows a fibrous stroma covered by a thin layer of ordinary epithelium. On the palate salivary rests are very occasionally observed and myosarcoma and fibrosarcoma may be encountered at various positions in younger subjects. None of these lesions is likely to respond to radiotherapy. Reticulosarcoma in the faucial region presents a swelling of a dusky red colour and often of considerable size. This may simulate a chronic quinsy, but suspicion should always be aroused if ordinary treatment with antibiotics does not rapidly clear up the condition.

Methods.

The preparation of patients for treatment is not here discussed. An excellent account of this and of technique together with after-care has been given by Nuttall (1943) and Nuttall and Chester-Williams (1955). Where the site and extent permit implantation of radium is excellent since an adequate dose is readily delivered to the appropriate site and is well tolerated because of the small volume of tissue treated (Paterson 1952). The tongue and buccal aspect of cheek are very suitable sites for implantation/

implantation which is also employed on occasion for the treatment of cervical lymphatic nodes. Radon seeds are sometimes appropriate where a lesion on the tongue is not too big to be dealt with adequately by this method which is specially suitable for old people. Only a very brief anaesthetic is required and the patient is not confined to bed nor worried with any apparatus or threads in the mouth, the seeds being left in position. Radium moulds or buccal applicators are useful in the treatment of reasonably localised tumours of the floor of the mouth but when the tongue is invaded or there is much lateral extension, an implantation or external radiation would be required owing to the very localised dose distribution about such applicators. Some tumours of the palate are also readily treated by this kind of apparatus. The fabrication of such moulds is accomplished in my department and I am greatly indebted to my own dentist who many years ago gave me sufficient information on the technique of taking impressions, making plasters and building up apparatus to enable me to initiate easy and practicable methods.

X-ray therapy has been used for lesions which are too inaccessible or too large for local methods and for the period under review the qualities used corresponded to only 200 Kv. at first and later to 220-250 Kv. This means that difficulty arose through the considerable absorption of the rays in bone already referred to (Spiers 1946) so that the dose at the tumour site will be less than calculation from isodose curves made under normal absorption conditions would indicate. External irradiation which is free from this disability has been available since 1938 through the provision of a radium beam unit (recently activated by radiocobalt). This unit is excellent in the head and neck sphere where no great depth effect is essential and multiple fields can be used to build up the lesion dose. I was fortunate

in getting this apparatus at a very early stage in the development of such devices and was able to show for what cases it was suitable (Charteris 1951). At the time of writing, cobalt beam units of great output and with very considerable depth dose have become available and there are also supervoltage types of machine giving radiation of similar qualities so that treatment in almost any part of the body can be rendered much easier from a technical point of view and much more comfortable for the patient. This development will be referred to again. Low voltage X-rays have been advocated in the treatment of the more accessible lesions within the mouth but experience shows that the difficulty of accurate adaptation of the nozzle to the lesion and of maintaining the apparatus in position is very great indeed so that I do not use this method.

The age of most of the patients and the situation of the tumours have in the past made surgical treatment a very difficult procedure but the recent great advances in the use of anaesthetics and antibiotics referred to earlier have modified the situation considerably. It is hoped, however, to show from the facts to be given regarding the extent of disease in relation to results that the cases which would be most amenable to surgery can be treated efficiently by radiotherapy unless there is bone invasion, and so it is contended that radiotherapy is still the method of choice. This assumes that it will be possible to treat efficiently the whole extent of the primary lesion and in many cases the area of lymphatic drainage as well, the lesion being of reasonable radiosensitive type.

Involvement of lymphatic nodes has been referred to and it must be admitted that up to the present the results of treatment either by surgery or radiotherapy have been disappointing in the case of definitely invaded nodes even when the primary lesion has responded excellently to treatment.

My/

My experience has been that the ordinary qualities of X-rays have not given good results in this sphere but some encouragement has come from the use of radium beam therapy while in addition special work has been going on for some years on the use of radium implantation in the neck. The usual methods seemed so disappointing that I introduced this technique and find that it has given some good results even in cases with fixed cervical metastases (Charteris 1954) so that the possibilities are still being explored (Fig. 12). The decision as to whether a neck requires treatment or not depends upon the known tendency of a primary growth to metastasise so that this treatment is always given for carcinoma of tongue whereas a tumour on the lip may well be watched as regards the formation of cervical metastases.

Before 1947 X-ray and radium therapy were dealt with in separate departments so that the cases in this series were mainly dealt with by radium methods. After 1947 there were naturally some X-ray therapy patients but only a few, and for completeness an attempt has been made at the end to include a statement on the earlier cases with which I was not associated. It has proved very difficult to get details but the facts, such as they are, will be mentioned for the sake of completeness (Appendix B).

Mouth

FIG. 10.

Herpes in the buccal cavity may be encountered and not all cases are so obvious as this one. Radiotherapy is often helpful.

Mouth

FIG. 11.

A dental granuloma on the mandible. It is not friable. Treatment is surgical.

Mouth

FIG. 12.

Massive involvement of lymphatic nodes with squamous carcinoma. The primary lesion was on the pinna.

The same case after implantation with radium. Patient has been well for many years.

CARCINOMA OF PALATE

The patients mainly present tumours of the hard palate although a few soft palate lesions are included. They are considered separately from the group of primary tumours of the alveolus although this structure might become involved in some of the more advanced palatal cases. The diagnosis is usually simple but salivary rests and dental granuloma have to be borne in mind while the presence of an antral carcinoma must be excluded since the downward extension of such lesions may simulate a palatal primary growth (Fig. 13).

During the years 1930-1949, 41 cases were seen and 40 were regarded as fit for treatment (Table 8). Twentynine of the patients were males and 11 were females, the average age being just over 69 years. A histological report was found in 26 of the records and no patients were lost from the follow-up.

Methods.

The chief method employed has been the use of a buccal radium mould applied to the part and worn for about 6 hours daily, a surface dose of 6000-7000r being delivered in some 10 days. This is an excellent form of treatment when the size and thickness of the lesion makes it practicable but as there is no chance of "sandwiching" the lesion between two planes of radioactive material, care must be taken in assessing the dose distribution from the mould which has inevitably a rapidly falling output at distances over 0.5 cms. because of the low radium-mucosa distance. The radium beam unit became available in 1938 and was naturally reserved for patients with lesions unsuitable for the local radium method so that it is usually the more advanced type of lesions which have been treated by this external method. Implantation is hardly ever a possibility in such cases unless the lesion is

of soft palate but 3 people were so treated for the years 1931 and 1932. One of these did well, living for 12 years. For the reasons already given, X-ray therapy has not been employed to any extent in this series but with modern facilities would tend to take a more important place than in the past. Only 2 cases were treated with X-rays.

RESULTS

In considering the results (Table 8) it will be noted that 27 of the 40 patients had early primary lesions (under 4 cms. diameter*) while 13 had a more extensive neoplasm. Only 4 patients presented clinical involvement of cervical node invasion and in 3 of these the nodes were mobile yet none of the patients survived while in contrast the fourth patient had a fixed cervical mass treated successfully by the radium beam method. Eighteen people were alive and well 5 years after treatment and of these 12 are well at the time of writing. Of the rest, five patients died from completely unrelated causes 6 to 10 years after treatment while the eighteenth was a man who suffered from recurrence of the growth 10 years after treatment from which he died in the thirteenth year.

Although the time of observation is not great enough for true assessment, it is of interest to note that in addition 3 patients died from unrelated causes 3 to 4 years after treatment, there being no evidence of malignancy at the time of death.

Lymphatic invasion has not been a prominent feature and the size of the lesion has had little influence on the results attained since 5 successful cases were found among the 13 with "late" lesions and 13 among the 26 classed as having "early" primary lesions.

*Lesions are classified as being above or below 4 cms. in maximum diameter as was done in the days of the National Radium Commission which adopted/

adopted this arbitrary dividing line between early and late primary lesions for their records. In actual fact this standard seemed to work quite well at that time and so it has been retained for the purposes of this communication.

TABLE EIGHT

CARCINOMA OF PALATE : 1930-1949

Cases seen - 41 Cases Treated - 40

Males - 29
Females - 11

Average age - 69.5 years

Primary growth extensive		13
Primary growth early		27
Cervical nodes palpable		4
Alive 5 years from treatment (as under)		18
Well to date	12	
Died unrelated cause (6-10 years)	5	
Died cancer (recurrence at 10 years)	1	
	18	

Mouth - Palate

FIG. 13.

Superficial carcinoma of palate suitable for buccal radium applicator.

The lesion is satisfactorily healed.

Carcinoma mainly affecting soft palate and suitable for external irradiation.

The lesion is healed after treatment with the beam apparatus.

CARCINOMA OF BUCCAL ASPECT OF CHEEK

Thirtytwo patients suffering from carcinoma of buccal aspect of cheek were seen during the years 1930-1949 and all appeared suitable for treatment. There were 26 males and 6 females, only 6 of the patients being under the age of 60 years, while 13 were aged 70 years or more (Table 9). No cases were lost from the follow-up. One patient received palliative treatment only.

This neoplasm may be encountered on any part of the mucous membrane concerned and the diagnosis presents no special difficulty. The site of the lesion naturally influences the treatment to some extent since this becomes more difficult if the tumour encroaches on the alveolus or extends posteriorly. Leukoplakia is by no means always associated with the condition but when it does occur there is a tendency to multicentric origin of the neoplasm which may introduce uncertainty in assessing the area which must be treated. (Fig. 14).

Methods.

Most of the patients have been treated by implantation of radium or of radon and if the size and position make this practicable, it is found to be a most reliable method. Radium needles are implanted by the percutaneous method and less often radon seeds are used from the buccal aspect in which case it becomes easier to carry the implant to the posterior part of the cheek. Radium moulds are seldom practicable, but occasionally a good distribution can be arranged if a buccal applicator can be combined with an external one so as to "sandwich" the lesion. Three cases were treated by X-ray therapy since the local methods just mentioned could not cope geographically with the lesion but none of these patients survived. The majority of the patients were treated by implantation (20 cases with 7 survivals), double moulds

accounted for 5 cases with one survival and radium beam therapy dealt with 4 cases, among whom there were 2 survivals. The primary lesion was regarded as early (under 4 cms.) in 20 of the cases treated.

As regards the condition of the cervical nodes, these were found to be palpable in 8 patients of whom 3 are alive, and fixed in 2 cases, both of whom died of the disease. Two of these with palpable nodes were treated by local clearance of the submaxillary triangle by surgery, histology being negative in one case and positive in the other: both patients survived. It will be noted that lymphatic metastases are slightly more common than in the case of carcinoma of the palate but they are not a very formidable factor.

RESULTS

Ten patients have survived for 5 years without evidence of disease and it will be seen from Table 9 that 3 of these are alive at the time of writing while 6 died of unrelated causes up to from 5–18 years after treatment. The tenth patient died from a recurrence of the disease 10 years after treatment.

The influence of lymphatic invasion has been indicated and it is found that the extent of the primary lesion has more influence on results than was seen in the case of carcinoma of the palate since only 4 of the 12 "late" cases survived, the remainder dying from continuance of the primary lesions.

TABLE NINE

CARCINOMA OF BUCCAL ASPECT OF CHEEK

1930-1949

Cases seen - 32

Cases Treated - 32

Males - 26
Females - 6

Only 6 cases under the age of 60 - 13 cases 70 years of age or more.

Primary growth extensive	12
Primary growth early	20
Cervical nodes palpable	8
Cervical nodes fixed	2
Alive 5 years from treatment (as under)	10
Well to date	3
Died unrelated cause (5-18 years)	6
Died cancer (recurrence at 10 years)	1
	10

Mouth - Cheek.

FIG. 14.

Carcinoma of buccal aspect of cheek.

Lesion healed after percutaneous radium insertion.

A more diffuse type of lesion.

Lesion healed after implantation.

CARCINOMA OF FAUCES

This type of tumour is fairly regularly encountered, and during the years 1930-1949, 107 cases were seen. It was decided that radiotherapy was indicated for 104 of these and it was found that only 4 patients were females. The maximum incidence was in the age group 61-70 years but there were 35 patients older than this (Table 10). By far the most usual tumour at this site is a squamous carcinoma and no others are considered though rare examples of myosarcoma and reticulosarcoma will occasionally be found, the latter appearing to be a good deal commoner in recent years, perhaps because they are now more often kept in mind. In only 63 cases is there histological confirmation but the clinical diagnosis is regarded as very obvious. Radiotherapy is very suitable for treatment but extension to the adjacent part of the tongue occurs readily and should be sought for by palpation. A still more ominous development is extension to the alveolus since this brings with it an imminent risk of bone invasion while deeper infiltration upwards towards the pterygoid fossa is similarly unfortunate since it is difficult to be sure how far the lesion extends towards the base of the skull in which situation treatment is not likely to be of avail (Fig. 15).

Methods.

Implantation of radium is a method which has been frequently used (32 cases) for the simple reason that during the earlier years this was the only effective method available but, of course, it was of too localised a character to deal effectively with some of the more extensive lesions and so only 5 of these patients survived. It was also difficult to deal adequately with metastases in the neck as the implantation method for this region was introduced comparatively recently and radium beam therapy was only/

only available from 1938. The latter seemed the obvious method to choose for the treatment of faucial lesions and indeed it has become the routine method, 13 of the 45 patients treated having survived: it should be noted that 4 of these were only fit for palliative treatment. The benefits initiated through the use of the beam unit have been greatly extended recently through the use of larger amounts of radioactive material available (cobalt) and one feels that improvement in results can be hoped for. In the present series X-ray therapy and even local radium apparatus were employed in a very few cases, generally a considerable time ago. Reference has already been made to the problem of absorption of less penetrating radiations in bone.

RESULTS

The results are summarised in Table 10 and it will be seen that the primary growth was of considerable size (over 4 cms.) in 65 of the patients. This has not appeared to influence the outcome as much as might have been expected since of the 24 survivors 9 were in this advanced category and 15 regarded as having less extensive lesions. Analysis of the records has shown that the condition of the lymphatic nodes is a much more serious factor so far as prognosis is concerned. Nodes were not palpable in 48 of the cases treated and of this total 19 died from the primary growth and 5 from metastases in the neck, the remainder being free from malignancy and either remaining well (10 cases) or dying from unrelated causes at varying intervals of time including periods under 5 years (14 cases). Palpable nodes were detected in 24 patients and in contrast only 3 of these survived while fixed nodes were found in 18 patients of whom only 2 showed a good result. In a further 14 cases the cervical metastases were described as massive and in these only one parient survived. The condition of the neck is, therefore, of/

of prime importance and again emphasises the value of early diagnosis: from what has just been said it can be seen that of the 56 people with palpable, fixed or massive nodal involvement only 6 survived up to 5 years (Table 10)*. Many of these patients were treated in early years when the technique was not highly developed and resources even poorer than at present so that the influence of involvement of lymphatic nodes has a correspondingly more serious effect upon the prognosis.

It will be seen that 24 patients were alive at 5 years and of these 10 survived to the time of writing, 2 died of recurrence 9 and 15 years after treatment and the remaining 2 were alive with active tumour at 5-6 years.

* The figures given on the preceding page regarding the influence of lymphatic invasion on prognosis are intended to give a general picture in this respect and so include the cases dying of causes unrelated to the tumour at periods under 5 years. The grand total of all cases living at the end of 5 years is 24 as shown in Table 10.

TABLE TEN

CARCINOMA OF FAUCES : 1930-1949

Cases seen - 107 Cases Treated - 104

Males - 100
Females - 4

Maximum age incidence 61-70 years. 35 cases older than this.

Primary growth extensive	65
Primary growth early	39
Cervical nodes not palpable	48
Cervical nodes palpable	24
Cervical nodes fixed	18
Cervical nodes massive	14
Palliative treatment only	15
Radical therapy	89
Alive at 5 years from treatment (as under)	24
Well to date	10
Died unrelated cause (5-23 years)	10
Died cancer (9-15 years)	2
Alive with cancer at 5-6 years	2
	24

Mouth - Fauces

FIG. 15.

Extensive carcinoma of fauces involving alveolus and palate.

The lesion is healed after external irradiation with the beam unit.

CARCINOMA OF TONGUE

Carcinoma of the tongue is a neoplasm which has been encountered very frequently in the past but the incidence seems to be dropping in recent years. The cases have, therefore, been reviewed for the years 1942-1949 only when no less than 155 cases were treated. Of these 35 were females and 120 were males and most of the patients fall into the age group 61-70. No less than 52 people were in the age group 71-80 years and there were only 9 patients under the age of 50. Notes upon the age incidence have been incorporated in the various sections since advancing years may have to be taken into account in deciding upon the method of treatment and this is specially true with tongue cases (Table 11). Histological reports are available in rather less than half of the cases.

The majority of the squamous carcinomas encountered here are of moderate radiosensitivity as is usual in buccal lesions but this varies according to the site and lesions are generally more anaplastic towards the posterior part of the tongue. The highly differentiated carcinoma seen in the anterior third or that associated with chronic glossitis of syphilitic type and often presenting multicentric origin have hardly ever been encountered for a good many years now: both of these types of lesion were usually found very resistant to radiotherapy. The diagnosis is generally quite simple but while the classical picture is that of a tumour mostly on the lateral part of the tongue about its middle third, all gradations to fairly anaplastic varieties may be seen. It is obvious that very varied biological types may be encountered and those, together with the site of the lesion, may have a considerable influence on the method of treatment (Fig. 16).

Methods.

As has been stated the choice of method will be bound to depend greatly upon/

upon the site and size of the primary lesion while lymphatic metastases have to be considered from the start since they are commoner than in the case of most of the other buccal sites. This may be due to the muscular and mobile nature of the tongue and if such deposits are not obvious at first, they will tend to develop in an untreated neck with considerable frequency. For some tumours in the mouth it seems quite justifiable to treat the primary growth and watch the neck, but the facts just given have led to my adoption of a combined treatment for tongue and neck for all who seem fit to undergo it. This involves implantation of neck and then tongue at the same time and is a procedure carrying much more risk than many of the usual radiotherapeutic procedures. The patient's general condition, therefore, requires careful assessment while the neck and tongue must be subjected to a most critical examination to determine the extent of the disease. Palpation of the tongue is essential not only for assessing the amount of invasion but for actually diagnosing tumours about the posterior part of the tongue where there may be little or no ulceration until a late stage in the disease. In these cases ordinary inspection of the mouth may reveal nothing and so the diagnosis might be missed.

The most commonly used and the most successful treatment for carcinoma of the tongue is radium implantation so that this is always employed where the site and size of the lesion permits. As regards other methods used because the lesion was too large or too awkwardly situated for implantation or because the patient was unfit for it, 33 cases had radium beam therapy and 16 had X-ray therapy. The first group presents 3 successful cases only together with 4 who died of other causes after varying periods of years while 2 patients were unfit to complete treatment, and the X-ray therapy group is represented by only one survivor.

Included/

Included in the records are 3 cases treated by surgery alone. These are the only ones known to me and 2 have done well, both being early cases with no lymphatic extension. The third of the surgical cases had been operated upon since she did not seem very suitable for implantation but recurrence took place and this was successfully dealt with by radium beam therapy.

The influence of lymphatic metastases is of special importance in this kind of case owing to the frequency with which they occur. The neck was treated by block dissection in 11 cases during earlier years but the results were disappointing since none survived and so I turned to radiotherapy in an endeavour to improve matters. X-rays of the qualities available have not appeared efficacious and while the radium beam unit seemed womewhat superior, I believed that an extension of actual implantation to the neck would be the most satisfactory procedure. I therefore initiated the method already mentioned of implanting the whole neck on one side and this is normally done at the same time as the implantation of tongue. The preliminary results already referred to are being supplemented by many more observations which tend to be encouraging and I hope that this method will contribute something towards solving the difficult problem of cervical metastases. This work does not, of course, exclude consideration of block dissection in suitable cases.

Results.

As regards results, Table 11 shows that 155 patients were treated and that 150 of them received radical therapy: there were 2 post-operative deaths. Of the 150 patients who had radical treatment, 35 were alive and well at 5 years. This total is made up of 20 who are alive and well to the date of writing; of 12 who died of some completely unrelated cause at periods between 5 and 8 years after treatment; and of 3 who died of cancer 7 to 10 years/

years after treatment. In addition there were 11 patients who died of completely unrelated causes but at periods not exceeding 4 years after treatment so that they cannot be regarded as providing very satisfactory evidence. Of those who died from cancer, 2 patients had multiple lesions (2 and 3 lesions respectively) and it is hardly surprising that treatment failed in their cases.

It has been noted that at this site the size of the lesion has a perceptible effect upon the survival rate since of the survivors 24 had lesions of moderate size (under 4 cms.) and 11 suffered from more advanced disease. Involvement of the cervical nodes made the prognosis very bad indeed as has been noted before. Most of the patients who did well had no palpable nodes at the time of examination and indeed only 7 survivors presented any nodes which could be felt. It is obviously impossible to be sure whether palpable and mobile nodes are enlarged through septic absorption or the presence of metastases, but these records seem to indicate that the more serious cause is generally the one involved. Fixed nodes were observed in 23 of the cases and only one of these have survived though 2 others died of unrelated causes but too soon after treatment to enable us to include them in the 5 year figures. The influence of the stage of disease both as regards the primary growth and its metastases is again very obvious and once more points to the importance of early diagnosis.

TABLE ELEVEN

CARCINOMA OF TONGUE : 1942-1949

Cases seen - 155 Cases Treated - 155

Males -120
Females - 35

Maximum age incidence 61-70. 52 in group 71-80 years. Only 9 are under 50 years of age.

Primary growth extensive	60
Primary growth early	95
Multiple lesions (among above)	2
Cervical nodes not palpable	91
Cervical nodes palpable	36
Cervical nodes fixed	12
Cervical nodes massive	16
Total number of cases treated radically	150

Alive at 5 years from treatment (as under)

Well to date	20
Died unrelated cause (5-8 years)	12
Died cancer (7-10 years)	3
	35

Mouth - Tongue.

FIG. 16.

The warty type of squamous carcinoma of tongue calling for maximal dosage by implantation.

The lesion is healed with some scarring.

A more anaplastic type of lingual carcinoma which may remain sub-mucous for a long time. This type is particularly dangerous in the posterior third of tongue. This patient died with massive cervical involvement.

CARCINOMA FLOOR OF MOUTH

During the years 1930-1949, 131 cases of carcinoma of the floor of the mouth were seen. Of these 114 were males and 7 were females, 29 being in the age group 51-60 years, 49 between 61-70 years and 39 between 71-80 years. The remaining 5 cases were under 50 years of age. No patient was rejected for treatment but 9 were only fit for palliative treatment: the balance of 112 cases received radical radiotherapy. The diagnosis is generally quite simple though there is sometimes confusion with simple denture irritation or the dental granuloma already described: retained dental roots may sometimes give rise to misleading symptoms (Figs. 11 and 17).

Methods.

The methods of treatment have changed a good deal since to begin with radium implantation was the standard method once more for the reason that it was the only effective one available, but as various techniques were developed dental applicators were used more and more where the size, distribution and thickness of the lesion made them a physical possibility. For effective treatment it is necessary to "sandwich" the lesions between a dental applicator and one in the submental region since this gives a very satisfactory distribution of dose which would be impossible while using a single plane of radium owing to the rapid drop in depth doses. A great advantage is that the method requires no anaesthetic as an implantation does and that the applications are intermittent and only made during the daytime.

The implant and applicator methods account for the treatment of 98 of the patients while radium beam therapy was used for 18 cases (15 up to radical dosage) having more advanced lesions, bealing being achieved in 5 of these. The remaining treatments were by X-ray therapy. The remarks already made regarding X-ray therapy as available during this period apply equally/

equally to floor of mouth cases.

Careful examination is necessary to see whether there is any extension into the tongue since if this has occurred dental applicators do not give an adequate dose distribution and either some form of implantation or of external irradiation will be necessary. Implantation may also have to be used for some lateral lesions where a local apparatus cannot readily be applied. Any extension from the floor has to be studied closely and X-ray films always taken since invasion of the alveolus will alter the whole picture and probably indicate surgery as the suitable method of treatment. No less than 13 of the present series showed bone invasion and none survived, but the advances in surgery which have since taken place should make it possible to cope with many of these and radical surgery would now be considered from the start. The problem of bone involvement will be further considered later on.

The condition of the lymphatic nodes is as important as ever and 46 patients showed evidence of this extension. Only 4 out of those with palpable nodes survived and 3 out of the 19 who had fixed nodes. The neck was treated by surgery in 4 cases, 2 of whom did well while the remaining 2 died from the primary growth. Microscopic examination of the nodes showed tumour in 3 of the cases. Other methods employed for treatment of the neck have been localised implantation of radium, the use of X-rays and the radium beam but all have proved disappointing: the newer and more extensive implantation method for treatment of the neck had not been developed during the time under review nor had the recent revival of surgical interest in block dissection taken place. Histological confirmation was available in 49 cases out of the total treated.

RESULTS

The results are shown in Table 12. Thirtyone people out of the 112 having radical treatment were alive and well at the end of 5 years and of those 12 survived to the time of writing over periods ranging up to 19 years. Eighteen people died of some unrelated cause at intervals ranging between 5 and 17 years while the last case died of a recurrence in the sixth year.

In addition 2 patients died from some unrelated cause 2 and 3 years respectively after treatment, and though the period is too short for any conclusion to be drawn, they were at least quite free from any obvious sign of their trouble.

Of the total cases seen 70 had primary growths regarded as being "early" (under 4 cms.) and 52 had more extensive lesions, this fact having an influence on the result as only 9 of the second group did well. The effect upon the results of bone invasion and of invasion of cervical nodes is very plain as has been indicated.

TABLE TWELVE

CARCINOMA FLOOR OF MOUTH : 1930-1949

Cases seen - 121 Cases Treated - 121

Males - 114
Females - 7

Maximum age incidence 61-70. 39 in group 71-80. Only 5 are under 50 years of age.

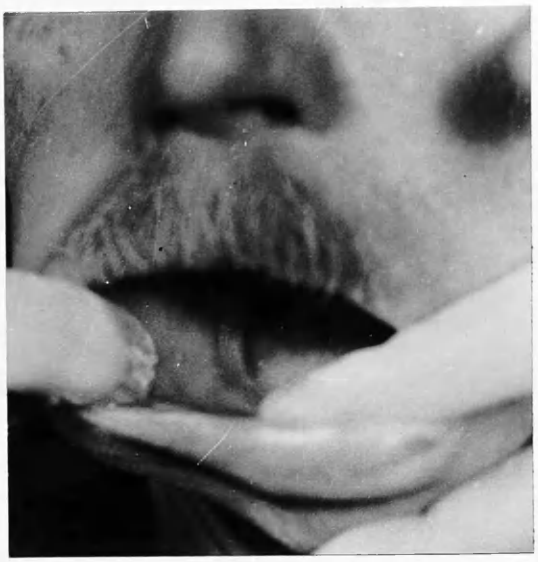
Primary growth extensive	52
Primary growth early	70
Cervical nodes not palpable	73
Cervical nodes palpable	27
Cervical nodes fixed	9
Cervical nodes massive	10
Faulty record of nodes	2
Palliative treatment only	9
Radical therapy	112

Alive at 5 years from treatment (as under)		31
Well to date	12	
Died unrelated cause (5-17 years)	18	
Died cancer (6 years)	1	
	31	

Mouth - Floor

FIG. 17.

Carcinoma of floor of mouth. The lateral position might indicate either implantation or external treatment.



The lesion is satisfactorily healed.

A more centrally situated tumour suitable for the "double mould" method.

The lesion is healed after local radium treatment.

CARCINOMA OF ALVEOLUS

The final type of lesion to be considered is carcinoma of the alveolus and 93 cases were seen in the years 1930-1949. Of these 70 were males and 23 females: 17 patients were not fit for anything but palliative treatment so that radical radiotherapy was used for only 76 persons. No patients were rejected for treatment. The age incidence is again high, there being 21 patients in the age group 51-60 years, 26 between 61-70 years and no less than 37 between 71-80. There were histological reports in 49 of the cases (Table 13).

The diagnosis is usually quite simple (Fig. 18). Local discomfort or the fact that a denture ceases to fit will generally draw attention to what is going on and a chronic hypertrophic ulcer which has resisted simple applications can be made out. When teeth have been extracted for the local discomfort, apparent slowness in the healing of the socket may cause some confusion while a condition met with occasionally is the dental granuloma or fibroma already described.

Methods.

A very satisfactory method of treatment when it is possible is the use of a dental mould or applicator adopted to the contour of the alveolus. As is the case with all such devices, the short radium-mucosa distance implies a small depth dose and so the method is only suitable for lesions of no great thickness. Implantation has been carried out in a few cases using the tongue as a means of supporting the radium plane in the right position but this is not very satisfactory unless only the inner aspect of the alveolus is involved although the treatment zone can be extended by implantation of the cheek as well. In later years radium beam therapy has proved very useful for such cases and is now the most frequently

employed method. Treatment of cervical nodes has generally been by the radium beam since this became available: only one case was treated surgically while a number had radium implantations which, in the earlier years, were of a very limited character as compared with the newer technique.

RESULTS

As regards the factors modifying the results, it may be stated that 60 of the patients had primary lesions of moderate extent (under 4 cms.) while 33 had more extensive neoplasms and only 5 of these survived. In this situation bone invasion is a very likely complication and no fewer than 29 patients had evidence of this, only one appearing among those well at 5 years. A sequestrum formed in this single case and became detached satisfactorily. Such patients would now be considered for surgery from the start but this was not the case in the earlier days under consideration. Lymphatic nodes were palpable in 16 patients and only 2 of these survived but a good many of them were in the palliative class owing to the condition of the primary lesion. Fixed or lymphatic metastases were present in 10 cases and only 2 of these survived, both being treated by the radium beam method.

Table 13 gives a summary of the results. Twentyfive patients were alive at 5 years and of these 17 are alive and well to date (up to 16 years) while one was alive but had just suffered recurrence of the lesion at the end of the fifth year. The remaining 7 died from some quite unrelated cause at periods between 5-9 years after treatment.

Not included in the Table are a further 8 patients who died without any sign of neoplasm at periods up to 4 years, while two of those classed as dying from the disease did so in the fifth year.

The malign influence of bone invasion is all too plain and details regarding the effect of invasion of lymphatic nodes have also been given.

The/

The only real remedy for such serious prognostic factors would appear to be the achievement of earlier diagnosis though one must not overlook what modern surgery has to offer in the cases where radiotherapy cannot be employed for the reasons given.

Mouth - Alveolus

TABLE THIRTEEN

CARCINOMA OF ALVEOLUS : 1931-1949

Cases seen - 93 Cases Treated - 93

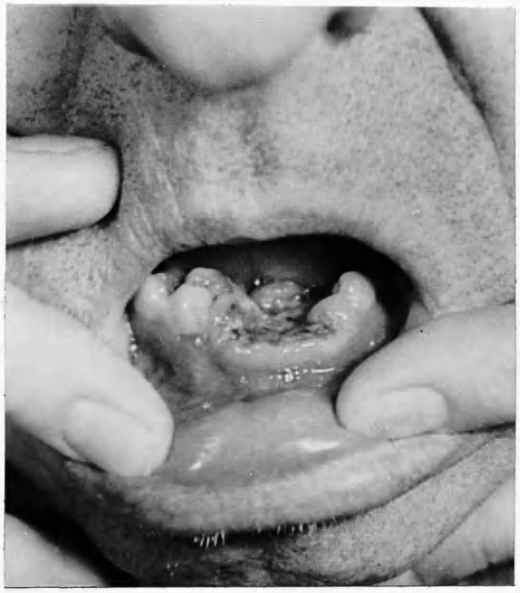
Males - 70
Females - 23

Maximum age incidence 61-70. 37 in group 71-80. Only 9 are under 50 years of age.

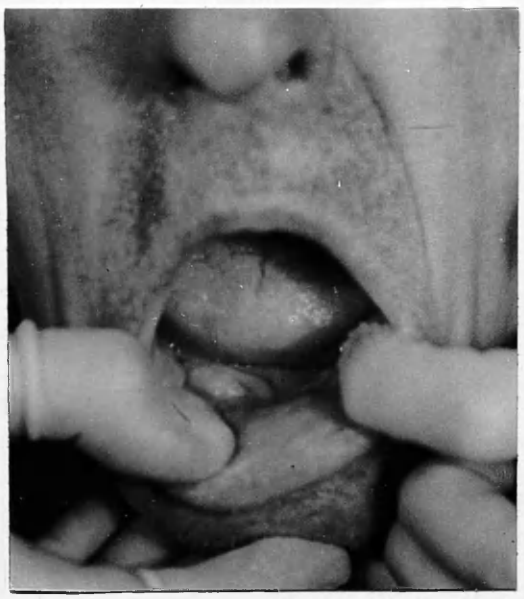
Primary growth extensive		33
Primary growth early		60
Bone invasion		29
Cervical nodes not palpable		65
Cervical nodes palpable		16
Cervical nodes fixed		8
Cervical nodes massive		2
Faulty record of nodes		2
Palliative treatment only		17
Radical therapy		76
Alive at 5 years from treatment (as under)		25
Well to date	17	
Died unrelated cause (5-9 years)	7	
Alive at 5 years but recurrence obvious at end of 5th year	1	
	25	

Mouth - Alveolus

FIG. 18.



Carcinoma of alveolus showing some loss of substance along the gum.



The lesion is healed after local radium application but the patient died eventually with cervical involvement.

COMMENT ON BUCCAL CARCINOMA

The local radium methods are highly developed and most efficacious when applicable but problems arise when larger volumes of tissue are involved not only as regards the administration of adequate treatment to such volumes but also because tissue tolerance becomes less and there is naturally a greater tendency to invasion of surrounding structures and to the occurrence of lymphatic metastases. Another consideration already mentioned is the effect of histological structure and this is one of the factors modifying radiosensitivity. Needless to say the possibility of carrying out radical radiotherapy in any given case must depend on the differential action of the rays on normal and on neoplastic tissue but so far the more recent attempts to modify sensitivity by such methods as the use of Synkavit or heightened oxygen pressure are not very convincing. Fortunately the majority of buccal lesions are treatable from this aspect at least, though very wide differences in structure can be seen especially in the tongue. A good deal has been said about lymphatic invasion and in many instances its development will completely alter the prognosis as the facts given have shown only too clearly. Only in the most radiosensitive types of tumour is external radiotherapy likely to be efficacious in the neck and the implantation method has been the most helpful line of attack though more recently block dissection is giving encouragement in suitable cases.

The serious influence of bone invasion on the prognosis has been stressed and cases showing this complication have come to be regarded in the past as incurable by radiotherapy. Advances in the use of antibiotics would, however, appear to open up some chance for such patients and a modified technique has been suggested by McWhirter (1956). I have seen X-ray films of a case with gross invasion of the mandible treated in

Edinburgh/

Edinburgh and showing perfect healing with reossification as a result of radiotherapy. The technique was based on what is done in two stage radium applications for carcinoma of the cervix uteri, the first half of treatment modifying the growth and so reducing sepsis, while the second half of treatment at a later date brings the dose up to radical level.

When the case is beyond the scope of local treatment, external methods have to be considered and in the earlier days this meant the use of X-ray therapy of a very simple nature and indifferent quality given by what now seem very primitive methods. In 1935 somewhat better X-ray equipment became available and a radium beam unit was installed in 1938, but unfortunately in spite of great efforts which I have made over a number of years the quality of equipment has not kept pace with advances in technique and much remains to be done not only in my Department but in this Region. The physical disabilities of the ordinary qualities of the X-rays through differential absorption have been referred to and, while in recent years co-operation with the physicists has done much to improve dose distribution especially by wedge filter technique, this is of small importance compared to the introduction of various supervoltage and large isotope units. These give an excellent quality of penetrating radiations with a good depth dose making it possible to reach and to treat the affected volume of tissue much more efficiently and easily. In addition, skin reactions are greatly diminished so that the patients are much more comfortable during and after treatment which is a point of great importance especially in the age groups here involved, and constitutional upset is also reduced. Such treatment methods are now widely available in this country but the West of Scotland has so far nothing of this kind. The introduction of these more advanced facilities can hardly produce any dramatic rise in the survival rate but improvement is to be expected and already results seem encouraging: the

vastly/

vastly better treatment conditions for the patients represent an important advance. It seems clear to me that it is along these lines that more immediate progress will take place, but even when we get modern apparatus it will just be as necessary to insist upon the vital importance of early diagnosis. It is believed that the development of the peripheral consultative clinics at which all methods are discussed is helping in this direction while the introduction of cancer records on a national scale, as is envisaged by the Department of Health, would give a clearer picture of what the position is really like as regards malignant disease. The fate of many patients is quite unknown at the present time.

In the meantime it is hoped that the foregoing study has indicated through the notes on the extent of primary lesions, on the influence of lymphatic invasion and on bone involvement that the reasonably early case has a fair chance of recovery after well planned radiotherapy.

APPENDIX A.

A SIMPLE METHOD FOR TREATMENT OF CARCINOMA OF PINNA

Lesions which are small enough in size and sufficiently peripherally placed to be included between two moulds of active area 3 x 4 cms. can be treated most efficiently by a simple surface radium method which I devised a good many years ago but never published. The difficulty presented by adopting any radioactive plane to the complex curvatures of the pinna can be overcome by converting the ear into a solid block or slab 1 cm. thick. This is achieved by filling in the various concavities with compressed chiropody felt cut to a suitable size and thickness. The width of 1 cm. is tested by calipers. If the ulcer has been ulcerating and is, therefore, infected it is given a preliminary application of proflavine oleate (1 per cent in liquid paraffin) which makes it possible to cover the lesion completely for the entire period of treatment. I was able to introduce this form of antiseptic preparation for certain forms of radiotherapy through the advice and guidance of Professor Carl Browning (Charteris 1937).

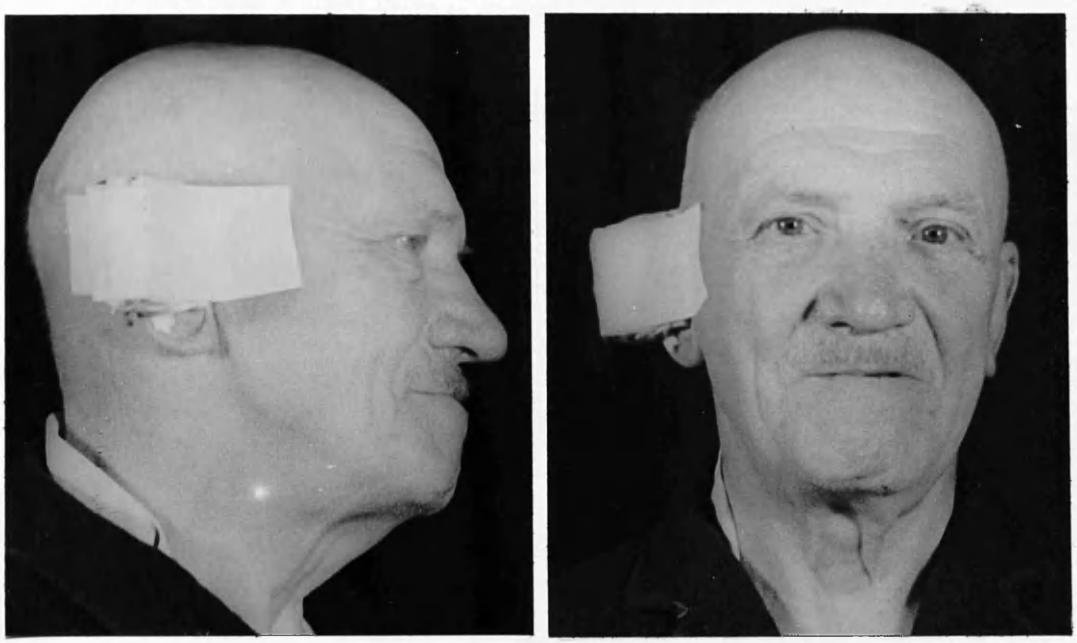
The radium is mounted on two pieces of the same felt 1 cm. thick and elastoplast is used to maintain the containers in place (Fig. 19). Small needles 15 mms. long with 0.6 mm. platinum filtration and containing 0.6 mgs. radium (element) are found suitable and 9.6 mgs. (16 needles) are required for each plane, the loading being that of a one-line rectangle according to the Manchester rules for distribution. The two planes are applied to opposite sides of the ear so that they are 1 cm. apart and a felt spacer is used to maintain this where the ear does not fill the gap. The apparatus is strapped in position with adhesive tape, the ear being at right angles to the scalp and maintained there by gamgee and bandages so that epilation does not follow. Treatment is continuous at 24 hours per day for 212 hours, this giving a combined dose of 6000r at skin falling to 5600r in the centre ear.

Experience/

Experience has shown the method to be an excellent one and I find only one case of recurrence among those treated in this way but it will at once be realised that only the smaller types of lesions can be dealt with by this technique (Fig. 19). Its use is not so limited as might be imagined, however, for the case shown (Fig. 20) was successfully treated in this way.

Appendix A.

FIG. 19.



The photographs show the simple felt apparatus applied to the ear as described. Gamgee and bandages complete the arrangement and protect against movement.

Squamous carcinoma of pinna in the above patient.

The lesion is healed with little skin change.

Appendix A.

FIG. 20.

The more fleshy type of carcinoma of pinna. In spite of its size it was included between felt moulds and did well.

The ear shows some fibrosis but has remained healed for many years now.

APPENDIX B.

NOTES ON EARLY X-RAY THERAPY FOR BUCCAL CARCINOMA

No survey of treatment results is entirely satisfactory unless all cases are included but this turned out to be exceedingly difficult owing to the separation of the X-ray and Radium Departments which existed until 1947 when all radiotherapeutic activities were co-ordinated and a unified follow-up system was introduced. Nevertheless a determined effort has been made to find out how many patients were treated and the old records have been examined carefully but many of the patients had been lost sight of.

It will be clear from what has already been said that this group of cases cannot be compared with those which I have dealt with in some detail since it is naturally made up for the most part of patients with very extensive lesions for whom local methods were not applicable and some of the cases were found to be failures after treatment with radium or by surgery. Six cases of lymphoepithelioma and lymphosarcoma in the throat were found but they did no better than the rest. One cannot expect any reasonable percentage of survivals from such material and there were, in fact, only six. These patients were found among the very small number with more localised lesions which happened to be treated primarily by X-ray therapy. It seemed right, however, that an attempt should be made to record this group so far as it was possible in order to give an overall picture of what was happening (Table 14) and of the total number of malignant cases involved so far as this hospital is concerned.

TABLE FOURTEEN

X-RAY THERAPY CASES ONLY - OUTWITH THE SURVEY

	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
FAUCES	7	4	2	5	2	2	0	0	2	4
TONGUE	10	5	3	0	1	2	0	0	3	6
ALVEOLUS	2	1	1	0	0	0	0	0	0	0
PALATE	1	2	0	3	0	0	0	0	0	3
FLOOR	1	1	0	0	1	1	0	0	0	5
CHEEK	0	0	0	2	0	0	0	1	0	0
TONSIL	6	2	4	5	4	0	0	3	1	0
Total Treated	27	15	10	15	8	5	0	4	6	18
Palliative Treatment only	3	2	2	1	0	0	0	1	0	5
Total Traced	24	11	9	12	8	5	0	3	6	11
Survivors	2	0	0	1	0	0	0	1	1	1

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ACKNOWLEDGMENTS.

An essential preliminary of my analysis was the rather dreary clerical work of transcribing certain facts from case records to sheets which could be more readily consulted and in this I was assisted by some of my staff to whom I am most grateful. This enabled me to correlate clinical data, treatment methods and results so reaching the conclusions stated.

For photographs I am indebted to the Department of Medical Illustration which has done splendidly in making the most of old negatives as well as contributing some modern photographs, while the Department of Dermatology has provided two excellent illustrations.

The reproduction of this communication has naturally involved a great deal of secretarial work and my grateful thanks are due to my secretary who has cheerfully undertaken this task.

Finally, I should like to acknowledge how much I owe to the various physicians and surgeons with whom I have worked for so many years.

Western Infirmary,
GLASGOW.

March, 1957.